Specifications for a Spectrum Monitoring System

1   Requirement

The Naval Research Laboratory has a requirement for one Spectrum Monitoring system. The system will be used for performing RF site surveys, automatically detecting and measuring intermittent interference and general spectrum monitoring. The successful offeror shall provide installation and perform an acceptance test to demonstrate that the system meets the government's minimum requirements.

2   Specifications

2.1   Frequency Range

Omni-directional monitoring: 25 MHz – 18 GHz

2.2   Omni-Directional Antenna(s)

a) 1-18 GHz: Receive RHCP, LHCP, Horizontal and Vertical polarization. Gain shall vary less than 3 dB around the horizon from all directions. Gain shall not vary more than 10 dB as the elevation varies from the horizon to straight overhead.
b) 25 MHz – 1 GHz: Vertical polarization shall be received.

2.3   System Software

The software shall provide basic system operating controls in a convenient graphical user interface.

2.3.1   Interactive Monitoring

The software shall enable the user to view Spectrum Traces.

2.3.1.1   RF Path Management

Interactive users shall be able to select an RF Path from a list of configured paths. Each path shall specify an RF feed (e.g. from an antenna), a switch position and the cables connecting them. Users shall be able to specify gain/loss values for each path for a set of frequencies. The monitoring software shall then interpolate between these values to display corrected values in traces and measurements.

2.3.1.2   Display Modes

The following displays shall be provided:
- Spectrum Trace
  - Optional Min, Max and Average traces on the same display
- Waterfall
- Spectrogram

2.3.1.3 Markers

Users shall be able to place two markers on any trace in the spectrum trace window. Each spectrum trace display window shall support an independent pair of markers.

2.3.2 Automated Measurements

The system shall provide the following types of automated measurements: Signal Logging, Carrier and Channel Occupancy/Statistics. The results of measurements shall be made available in a relational database for later analysis.

2.3.2.1 Disk Space Management

The space allocated to measurement results shall be finite and configurable. The system shall retain the latest measurement data when some data must be automatically discarded. On-line storage shall be available for 5 million spectral traces of 400 points each.

2.3.2.2 Signal Logging Measurements

The system shall detect and log the frequency and power of signals that are significantly above the selected threshold. Users shall be able to configure alarms that are generated when signals are found. Users shall be able to store every trace into the database for later viewing.

2.3.2.3 Masking

Users shall be able to define sets of start and stop frequencies to mask out uninteresting signals.

2.3.2.4 Carrier Measurements

Carrier measurements shall record the following parameters:
- Center Frequency
- Max and Average Power
- SNR
- Occupied Bandwidth
- Profile Compliance

2.3.2.5 Channel Occupancy and Statistics

Channel Occupancy and Statistics shall be recorded on a configurable interval or running basis. Power statistics for each channel shall be recorded.

2.3.3 Coordination

The system shall allow multiple users and automatic monitoring simultaneously.

2.3.3.1 Task Scheduling

The system shall provide automatic calibration.

2.3.3.2 Alarms

The system shall generate alarms when user-configured parameters are exceeded.

2.3.3.3 Remote Operation

The software shall directly support remote operation of the monitoring system over an IP connection.

2.3.4 Reports

Pre-configured report generation shall be supported for each type of measurement.

3 Training

Contractor shall provide on-site training to a maximum of 6 government personnel.

4 Installation/Acceptance Testing

The Contractor shall provide installation and acceptance testing at the Naval Research Laboratory, Building 2, RM 281, 4555 Overlook Ave SW, Washington, D.C. 20375-5320. The test shall demonstrate that the system meets the governments requirements listed in section 2.0 above.

5 Deliverables

1) Spectrum Monitoring System including:
    a. Portable case with rack
    b. Controlling computer
    c. Spectrum Monitoring automation software
    d. RF Measurement Instrument
2) Antenna(s)
3) Design Review (teleconference acceptable)
4) RF Switch Assembly (if required)
5) Soft copy of User's Manual (PDF)

6 Delivery

The desired delivery time for this COTS product is 45 days. Antennas may be delivered within 180 days. Installation and training should be available within 30 days from delivery, schedule to be determined by NRL and contractor.